

**UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF OHIO
WESTERN DIVISION**

United States of America, et al.,)	
)	
Plaintiffs,)	
)	
v.)	Case No. 1-02-107
)	
)	
The Board of County Commissioners of Hamilton County, Ohio and The City of Cincinnati,)	Judge S. Arthur Spiegel
)	
)	Magistrate Judge Timothy S. Hogan
)	
Defendants.)	
_____)	

**THIRD DECLARATION OF
MICHAEL KAVANAUGH, Ph.D.**

I Michael Kavanaugh, Ph.D., being of full age, hereby declare and state as follows:

1. I am a research economist residing in Batavia, Ohio. I regularly consult with the United States Department of Justice, the U.S. Environmental Protection Agency, citizen groups, and others on economic issues. My work often involves the economic issues that arise in the enforcement of federal environmental laws. A copy of my curriculum vitae is attached as Ex.A.
2. This is my third declaration in this case. The first addressed the USEPA's civil penalty policy; the second addressed the affordability of overflow controls to the ratepayers of Hamilton County. Copies of these earlier reports are attached as Ex. B and Ex.C.
3. This declaration addresses some of the financial complexities and ambiguities in administering the financial aspects of the proposed 2nd consent decree (CD) between the United States et al., and The Board of County Commissioners of Hamilton County, Ohio and The City of Cincinnati.
4. In my opinion, the financial complexities and ambiguities in the proposed Second Consent Decree require the use of a financial expert (a special master), one who is

independent of the plaintiffs and defendants and who is empowered by the Court to oversee, audit, require reporting by the Defendants and advise the Court on the financial aspects and progress of the proposed CD.¹

5. The goal of the Consent Decree, as stated, is the expeditious compliance by MSD with the requirements of the federal Clean Water Act. The CD will not, in my opinion, achieve timely and expeditious compliance with the Clean Water Act, without the use of a financial special master.
6. Over the next 15 to 20 years, MSD will increase rates in order to raise over a billion dollars to pay for the measures in the proposed Consent Decrees. It is in the public's interest for the Court to see that these remediation funds (related to the Consent Decree) be spent as they are intended to be spent—that is, to correct illegal sewage overflows and other violations of the CWA and to assure that there is adequate sewage-carrying capacity in the existing system—and not to finance extensions of the collection system or flood control projects that are intended to be financed through the County Storm Water Management District or by other funding mechanisms. Diligent oversight and follow-up are needed to make sure that the sewer system remediation funds are spent as intended.²
7. Previous attempts to deal with the region's wastewater collection and treatment problems with a CD monitored by Federal and State authorities have been unsuccessful. In my second declaration, I wrote³:

MSD has been violating the Clean Water Act for over a generation. In 1985, in an effort to remedy on going violations of the Mill Creek Treatment Plant NPDES permit, the United States filed a civil action against MSD. This civil action led to a consent order that required corrective measures to bring the plant into compliance. In 1991, the MSD commissioned the Stormwater Wastewater Integrated Management Plan (SWIM). The SWIM report acknowledged structural deterioration to the collection system was ongoing since 1968 causing basement flooding and sewer overflows from overloaded trunk sewers.⁴ The system barely achieved a Class D rating. In 1992, the Director of the OEPA issued Findings of Fact and Orders against MSD to require elimination of Sanitary Sewer Overflows. MSD has not met the terms of the DFFO, as many sanitary sewer overflows continue to the present time. Negotiations and violations of the CWA continue to this day.

¹ In 2003 in a case in which I was involved a Special Master was appointed to oversee a site clean up *Interfaith Community Organization et al., v. Honeywell International et al.*, U.S. District Court, District of New Jersey, Civil Action 95-2097 (DMC). The cleanup will take at least ten years and cost over \$1 billion.

² A moratorium on new hook-ups is another way to prevent rate increases from being used to fund system expansions.

³ See my second declaration at paragraph 2.

⁴ SWIM, Summary Report p.4. I interpret the SWIM statement to mean that for at least 21 years MSD did not spend sufficient funds to repair and maintain the collection system. Further, since from 1991 to the present the collection system continues to cause basement flooding and overflows from trunk sewers, then the insufficient funding observed by the authors of the SWIM report in 1991 continues to this day. I conclude that for 35 years the collection system in the care of MSD has been only partially funded.

8. There are numerous ambiguities and complexities that are likely to arise in administering the provisions contained in the IPCD and the 2nd Decree. In this declaration, I will focus on Section IX. **Completion of Construction Deadlines B. Extension of Deadlines if Capital Costs Exceed \$1.5 Billion (IX.B)** in the 2nd Decree as an example of why a special master is needed in this case. This paragraph of the 2nd Decree provides "...that the schedule for substantial completion of construction for the remedial measures in the Long Term Control Plan update and the Capacity Assurance Program Plan... [may be extended] .. if Defendants demonstrate that the expected capital costs (in 2006 dollars) in the Long Term Control Plan update and the Capacity Assurance Program Plan are expected to exceed \$1.5 billion."⁵
9. Section IX.B will be very difficult for the Court to administer, without the services of a special master because:
 - the Consent Decree runs for 18 years without enforceable intermediate milestones or deadlines;
 - the trigger value for IX.B (\$1.5 billion, 2006 dollars) is materially influenced by the choice of an index used to convert past and future dollars into 2006 dollars;
 - some construction projects may have more than one use and there will come the need to apportion costs over the different uses (e.g., sewer overflow control and flood management);
 - IX.B is stated in terms of expected costs not actual costs, this interjects a large element of opinion into the determination of the cost of the construction projects and MSD has previously exaggerated costs;
 - IX.B creates a significant incentive for MSD to overstate costs;
 - IX.B also creates an incentive to substitute capital costs for operation and maintenance costs and this may not be in the public's interest; and,
 - IX.B creates ambiguities when it allows the costs associated with the on-going operations (such as manhole relining and sewerage in basements programs, as well as costs of expected new regulations) to be included in the \$1.5 billion cap.
10. According to Section IX.B, the final end-date for compliance with Clean Water Act requirements can be changed by MSD, if it estimates that capital spending will exceed \$1.5 billion in 2006 dollars. Ambiguities are likely to arise as to what spending to include and how to value it. Only ongoing, diligent monitoring and auditing of progress that can endure until 2022 has any chance of avoiding serious future disagreements about the provisions established in IX.B.
11. Section IX.B recognizes that a dollar today will buy more than a dollar tomorrow when it states that the cap should be expressed in 2006 dollars. What this means is that any capital spending prior to 2006 is inflated to 2006 dollars and spending subsequent to 2006 is deflated to 2006 dollars. Unfortunately, there is no guidance in the CD as to what index to use to inflate or deflate the dollars spent on capital

⁵ Whether \$1.5 billion is sufficient to protect human health and the environment from human waste in the MSD service area is beyond the scope of this declaration. Thirteen ten years ago, MSD estimated in the 1991 SWIM report that it would take \$1.3 billion to make MSD a class B system. Inflation alone would push that cost to \$1.7 billion.

spending. If the principle in establishing a cap is to limit the rate paying community's spending for controls—and there is no “affordability” evidence why this should be so—then a broad measure of price change like the fixed-weight gross product deflator or the consumer price index would be appropriate.⁶ If the principle in establishing the cap is to guarantee a level of effort stated in 2006 dollars then an index of the goods and services used to provide pollution control is the more appropriate index. Examples of indices that have been used include the McGraw-Hill Chemical Plant Index and the Engineering News Record Construction Cost Index. Historically there have been significant differences between a broad measure, like the CPI and a narrow measure like the Construction Cost Index. These differences when accumulated over eighteen years could trigger the cap in one instance and not in the other.

12. Although IX B is stated in terms of the capital spending of the Consent Decree's remedial measures, there remain considerable ambiguities regarding which projects to include and how to value them.⁷ For example, a project may have a multiple uses; it may be a remedial measure, part of a SEP Project, or part of a flood control project.⁸ How much to apportion over each use requires principled expertise. A special master can provide this expertise.⁹
13. Section IX.B's use of the phrase “expected capital costs” is unfortunate. “Actual capital costs” is required in order to discipline reporting and allow for independent review and audit. Moreover, experience with MSD's spending estimates is troubling. MSD's first estimate of eliminating sewerage in basements of some (not all) Hamilton County residents was about \$250 million, while current estimates are as low as \$37 million.¹⁰ MSD has proposed duplicative solutions in previous remediation estimates (BBS Study) that overstate costs by at least \$500 million.¹¹ A special master could monitor and audit MSD's estimates and compare them to actual results and thereby exert some discipline on MSD's estimating behavior. This monitoring and auditing would provide the Court and the public with a database from which to challenge in future forums MSD's spending claims.
14. Within economics there is a body of thought dealing with so-called “perverse incentives”. This is often referred to as “moral hazard”.¹² IX.B creates two moral hazards for MSD. One, MSD is given a direct incentive to overestimate capital costs; two, MSD receives an incentive to fix a problem using solutions that are biased

⁶ The EPA's CSO Policy provides for limits on CSO control spending, where a community-specific, affordability analysis has been undertaken and demonstrates that the rates are at a specified percentage of median household income. No such affordability analysis has been done to my knowledge that would justify the use of a \$1.5 billion cap in this case.

⁷ IX.B calls for including the remedial measures in the Long Term Control Plan and the Capacity Assurance Program Plan plus the expenses for Sewer Relining and Manhole Rehabilitation (B.1), Water in Basement (B.2) and Remedial Measures for complying with New Legal Requirements (B.3)

⁸ Escrow or third-party administration of SEP funds would work to lessen but not eliminate this problem.

⁹ By analogy, this problem is like one that is occurring in rate of return utility regulation where decisions are made about what is in the rate base and what is not.

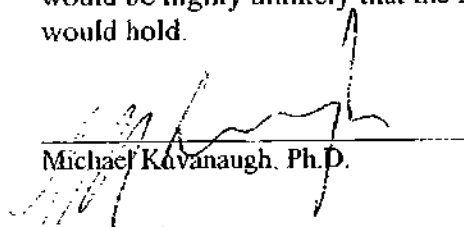
¹⁰ E.g., compare the BBS Report (2001) for “buying out” homeowners with sewerage in basements with the costs of the grinder pump option now being proposed.

¹¹ See my second declaration at 14 c.

¹² An introduction to this literature is found in Chapter 8 of *Microeconomic Analysis* (1978 edition) by Hal Varian, Norton.

towards capital and away from preventive maintenance and changes in operations. The incentive is created because MSD receives an automatic benefit – avoiding stipulated penalties from failing to fulfill the requirements of the Consent Decree by February 28, 2022 – by using high estimates of capital spending and spending for capital rather than for O&M. Effective monitoring and oversight by a special master is crucial to overcoming these moral hazards.

15. Section IX.B. provides that sewer relining and manhole rehabilitation may be included in determining whether the capital costs for the remedial measures are expected to exceed \$1.5 billion. The problem is this: MSD--even during this regime of non-compliance--has been spending capital dollars for relining sewers and rehabilitation. If CWA compliance is going to be achieved, then there is going to have to be more spending for relining and rehabilitation. Otherwise, MSD's spending for baseline relining and rehabilitation is just taking dollars from some other overflow project. The principle should be that only spending for relining and rehabilitation that is above historical baseline amounts should count against the \$1.5 billion cap, if in fact there should be a \$1.5 billion cap, at all. If this principle is to be put into effect, there must be effective monitoring and oversight by a special master.
16. Section IX.B provides that any capital spending for "new, more stringent requirements imposed on Defendants due to regulatory changes" may be included when determining if the cap is exceeded. This provision is vague, requires interpretation and is likely to cause serious disagreement in the future. A special master could provide the principled interpretation this provision needs.
17. In conclusion, it is my considered opinion stated to a reasonable degree of economic certainty that, without close financial supervision of a financial special master, it would be highly unlikely that the 2022 CWA compliance end-date in the 2nd Decree would hold.


 Michael Kavanagh, Ph.D.
 Date: JAN 30, 2007

Sources Considered

BBS Corporation Report, June 2001

Proposed Wastewater Management Plan, (SWIM Plan), MSD July 1991

Consent Decree on Combined Sewer Overflows, Wastewater Treatment Plants and Implementation of Capacity Assurance Program Plan for Sanitary Sewer Overflows
 United States District Court, Southern District of Ohio, Western Division, #1-020107.

Exhibit A

MICHAEL KAVANAUGH
160 Wood St.
Batavia, OH 45103-2923
Voice/Fax (513) 732-3939
E-mail M.kavanaugh@att.net

PRESENT POSITION: Private practice, since 1985

PREVIOUS POSITIONS

Senior Economist/Project Manager, ICF Incorporated, 1983-85,
Washington DC
Research Director, Public Interest Economics Foundation, 1976-83
Washington DC & San Francisco CA
Assistant Professor, Northern Kentucky University, 1975-76

EDUCATION

Ph.D., Economics, University of Cincinnati, 1975
BA, Economics, Xavier University, 1970

EXPERIENCE

Dr. Kavanaugh is:

- an independent research economist with over twenty-five years of experience;
- a national expert in environmental enforcement and policies for municipal and industrial pollution sources;
- experienced in natural resource damage assessment and regional economic impact assessment; and,
- an author of groundwater management and climate change papers.

Short descriptions of selected projects follow.

ECONOMICS & FINANCE

Applied economics to many of the environmental changes of the last twenty-five years including:

- estimating the benefits of cleaner beaches and rivers;
- developing methods to determine the effects of water quality policies on agricultural output, employment, and income;
- developing methods to estimate the benefits of preserving groundwater quality;
- estimating expected and realized benefits and costs of irrigation projects; and
- critiquing efforts to regulate effluents from several industries.

Examples include:

Exxon Valdez - Estimated the employment and income effects from spending the civil settlement. The work involved characterizing the options in the restoration plan in terms of input/output models.

Ohio River - valued public resource damages from spills from tugs and barges. The work combined results from the Natural Resources Damage Assessment models for Great Lake environments, studies of the costs of reducing risks to drinking water, and restoration costs.

Kailua Beach State Park - valued a three-mile public beach based on recreational use and estimated the damage to the beach from wastewater treatment plant effluent. The work involved reviewing, updating and synthesizing a variety of studies that valued recreation.

Florida Beaches - valued beach closures from pollution at several beaches. The work involved extensive use of the Natural Resource Damage Assessment models for coastal and marine environments.

Provided expert economic and litigation support services to the United States (and others) in Clean Water Act, Clean Air Act, Superfund, Resource Conservation and Recovery Act Enforcement Cases.

Designed and used financial after-tax, cash-flow models to:

- estimate the benefit gained by entities that violate their discharge permits;
- measure the effect of penalties on their financial position; and,
- estimate the residential burden for controlling overflows from combined and separated sewers.

Advised environmental groups on the use of contingent valuation to value natural resource damages and commented on the Federal Register Notice on the use of contingent valuation to determine damages.

Testified about the influence of groundwater quality on residential property values.

Design team member to size and fund the CERCLA Superfund and the WVA acid mine drainage reclamation fund.

Testified about the change in rates needed to pay for adopting cooling water intake controls at a nuclear power plant.

Testified to the benefits North Miami received from a landfill and on the economics of operating a landfill (Orange County, NY).

Conducted several analyses of the U.S. petroleum industry: to estimate current and future production in wetlands and in the arctic; and, to estimate the cost effectiveness of technologies to control produced water discharges.

Estimated current and future greenhouse gas emissions by fuel, sector, and region. The work involved estimating long-term energy use using an economic model based on prices and income and forecasting combustion technology. Atmospheric modelers use the work.

Advised and submitted affidavits supporting Alaska's position on oil and gas leasing in the North Aleutian Basin.

PUBLICATIONS

"Fuel economics available from ultrahigh bypass jet engines" in *Cost estimates of measures available to reduce U.S. greenhouse gas emissions by 2010*. ICF Washington D.C. 1990.

"End-use efficiency and NOx emissions in aviation". In S. Meyers, Ed. *Energy efficiency and structural change: Implications for the Greenhouse problem*. Lawrence Berkeley Laboratory, Berkeley CA 1988.

Estimates of future CO, N2O and NOx emissions from energy combustion, *Atmospheric Environment*, March 1987.

Tropospheric CH4/CO/NOx: The next 50 years. Co-author with Anne M. Thompson. UNEP/USEPA International Ozone Conference, 1986.

Eliminating CFCs from aerosol uses: the U.S. experience and its applicability to other nations. U.S. Environmental Protection Agency, Washington, February 1986.

The 1983 world oil surplus: some implications for OCS leasing. Prepared for the U.S. House Subcommittee on the Panama Canal/OCS Washington, April 1983.

The effect of OCS leasing schedules and procedures on fair market value. Paper presented to the Western Economic Association, Seattle July 1983.

Efficient strategies for preserving groundwater quality, with Rob Wolcott. U.S. Environmental Protection Agency, May 1982.

Exclusive territorial distributorships and consumer welfare: the case of beer. Food Marketing Institute, Washington D.C. 1982.

The Great Giveaway, with others, Sierra Club, October 1982.

The public benefits of the proposed Union Pacific, Missouri Pacific, Western Pacific Consolidation. Interstate Commerce Commission, August 1981

Regional economic impacts of OCS oil and gas development. with Susan Little and Rob Wolcott. Governor's Office of Planning and Research, California, November 1976.

MICHAEL KAVANAUGH

Federal Court Trial Testimony Since 1/91

NRDC v. Texaco - Wilmington - 2/91, 88-263-JRR
U.S. v. City of San Diego - San Diego - 2/91, 88-1101-B(IEG)
SCLDF v. City/County of Honolulu - Honolulu - 1/93, 90-00218-HMF
Friends of Earth v Laidlaw - Columbia SC - 11/93, DSC 3-92-1697-17
PIRG v. MEI - Newark - 1/94, DNJ 89-3193
Friends of Earth v Laidlaw - Columbia SC - 7/95, DSC 3-92-1697-17
Friends of Earth v. Gaston Recycling 7/95, DSC 3-92-2574-0
PIRG v. Hercules - Camden NJ - 2/97, DNJ 89-2291
U.S. v. Rapanos et al. - Detroit MI - 10/2000, 94-CV-70788DT
PIRG v. Rahway - Rahway NJ - 4/2001, UNN-L-163-98

Deposition Testimony since 1/91

U.S. v. San Diego 1/91, 2/91, 88-1101-B(IEG)
SCLDF v. C&C Honolulu (Sand Island) 2/91, 90-00219 ACK
U.S. v. Louisiana Pacific & Simpson Paper 4/91, C-87-0567-MHP
PIRG v. Hercules 7/91, DNJ 89-2291
U.S. v. Corning 9/91, 3:CV-90-207

NRDC v. Total Petroleum 5/92
PIRG v. Witco Chem. 5/92, DNJ 89-3146
Hawaii's Thousand Friends v. C&C Honolulu (Honouliuli) 6/92, 90-00218-HMF
PIRG v. Circuit Foil 12/92, DNJ 89-5371

Arkansas Wildlife Fed. v. Hudson Food 5/93
U.S. v. Lawrence Cty. 5/93, C-1-91-302
PIRG v. Essex Cty. 6/93, DNJ 92-4465

PN. Enviro. Council v. Dana 4/94, 1-92-0074
Friends of the Earth v. Gaston Recycling 1/95, DSC 3-92-2574-0
Stevens v. McGinnis, Inc., et al. 2/95, C-1-93-442
Save Our Beaches v. C&C Honolulu (Kaneohe/Kailua) 3/95, 92-00263
DAE
City of Independence, Mo. v. Amoco 8/96
California Sportfishing Alliance v. El Dorado 8/96, CV-S-95-699
SF Baykeeper v. Dow Chemical Co., 9/98, C97-01988
American Canoe Association v. Green Valley-Greenwood PSD, City of St.
Albans and Dunbar PSD, WVA. 10/98, 97-0949
Interfaith Community Organization v. Shinn et al, 2/00, 93-4774, 94-3434,
94-3793
U.S. v. Rapanos et al, 9/00, 94-CV-70788DT
American Littoral Society V. Rahway Valley Sewerage Authority 10/00, UNN-
L-163-98
American Canoe Association v. WASA, 4/02, 1:99cv02798 (IHK)
Sierra Club et al v. Hamilton County, 4/03 1-02-107

Exhibit B

DECLARATION OF MICHAEL KAVANAUGH

I, Michael Kavanaugh, affirm and state as follows:

1. I am an economist doing business at 160 Wood Street, Batavia, Ohio 45103. I received my Ph.D. in economics from the University of Cincinnati in 1975 and my BA in economics from Xavier University in 1970. I taught economics at the University of Cincinnati and at Northern Kentucky University. I have worked as a natural resource and environmental economist for a variety of clients for 30 years. My clients include the U.S. Department of Justice, the U.S. Environmental Protection Agency, the Ohio Attorney General and various citizen groups. I have qualified as an expert in federal courts on the economic benefit gained by dischargers who violated their permits under the Clean Water Act, and on the burden placed on defendants by penalties and remedies. I have estimated the economic benefit enjoyed by municipalities because of non-compliance with environmental regulations numerous times. I have testified in court and in deposition about the economic benefit enjoyed by municipalities at least ten times. I have attached my resume to this declaration.

2. I have had limited involvement with this case on behalf of the United States. I attended a meeting between the United States and MSD in June 2001. Subsequent to that meeting, I constructed a set of mathematical formula that allowed the user--by setting values for key variables--to determine the share residential rates would have of median household income.

3. In early 2002 the Sierra Club asked me to help them in their intervention by describing my understanding of: (1) the process of determining the burden on residential ratepayers placed by remedies and penalties, and, (2) the process of determining economic benefit for a municipality. The Sierra Club compensates me for this work on a time and materials basis at the rate of \$125/hr.

4 The burden placed by remedies and penalties—often referred to as the ability to pay or the economic impact—is a statement about the cost of remedy and penalties relative to a measure of income. Cost estimates alone do not contain enough information to draw a conclusion about the extent of the efforts the municipality is making to remedy a problem. Cost statements alone are inadequate to make judgements about the burden a community will bear to protect human health and the environment.

5 The usual measure of burden is made by (1) expressing the annual charge for wastewater services paid by households as a share of median household income; and (2) comparing that result to the thresholds USEPA has established for indicating burden. Typically annual charges include current costs (operating plus debt service), non-overflow replacement and improvement costs, and overflow costs. Since overflow controls are built and paid for over ten to twenty years, estimates of costs in future years are made. Similarly current and future estimates of median household income are made. These results may then be compared with the thresholds that indicate burden.

6 Economic benefit is the cash that if removed from the defendant today will leave it in the same financial position had it complied without delay. Simply removing the economic benefit is not a deterrent to non-compliance. To deter non-compliance a penalty must exceed the economic benefit in order to make non-compliance more costly than compliance. Accordingly, it has been a long-standing national policy that at a minimum a penalty should remove all of the violator's economic benefit. I have never been involved in an enforcement action that was settled without the payment of civil penalties. In my opinion if a case were to settle for a zero penalty the regulated community would receive a signal that non-compliance is less expensive than compliance. Those members of the community currently out of compliance would remain there until ordered, and those members of the community that were already in compliance would receive a signal to reduce their pollution control efforts.

7. For settlement purposes, the USEPA has developed a tool to estimate economic benefit (the BEN Model). The model uses estimates of the avoided and delayed spending needed for pollution control, the dates over which spending was avoided or delayed, and economic and financial parameters to make a present value estimate. The BEN model has been applied to numerous municipalities and non-profits.

Pursuant to 28 U.S.C. § 1746, I declare under penalty of perjury that the foregoing is true and correct

Date

MICHAEL KAVANAUGH

Exhibit C

**UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF OHIO
WESTERN DIVISION**

United States of America, et al.)	
)	
Plaintiffs,)	
)	
v)	Case No. 1-02-107
)	
)	
The Board of County Commissioners)	
of Hamilton County, Ohio and The City of)	Judge S. Arthur Spiegel
Cincinnati)	
)	Magistrate Judge Timothy S. Hogan
)	
Defendants.)	
)	
)	
)	

**SUPPLEMENTAL DECLARATION OF
MICHAEL KAVANAUGH, PH.D.**

I Michael Kavanaugh, Ph.D., being of full age, hereby declare and state as follows:

A Introduction and Summary

1. The Miami Valley Group of the Sierra Club asked me to review and comment on the statements made by the Metropolitan Sewer District of Greater Cincinnati (MSD) and its consultants¹ about MSD's ability to pay for the pollution controls needed to remediate violations of the federal Clean Water Act. Ability-to-pay, sometimes called financial capability, means a community can pay for pollution control spending without financial distress. For a community, financial distress is signaled if a measure of user fees² expressed

¹ Mr. Clyde Wilber in cooperation with Professor George Vredeveld.

² According to US EPA, the measure is the average household user fee less depreciation. This is total system cost less depreciation multiplied by the residential sectors' share of flow divided by the number of

as a share of median household income exceeds a certain threshold. The Sierra Club also asked me to estimate the rates needed to pay for pollution control spending.³ MSD provided the costs of collection system improvements and treatment plant upgrades needed to comply with the Clean Water Act (CWA).

2. MSD has been violating the Clean Water Act for over a generation. In 1985, in an effort to remedy on going violations of the Mill Creek Treatment Plant NPDES permit, the United States filed a civil action against MSD. This civil action led to a consent order that required corrective measures to bring the plant into compliance. In 1991, the MSD commissioned the Stormwater Wastewater Integrated Management Plan (SWIM). The SWIM report acknowledged structural deterioration to the collection system was ongoing since 1968 causing basement flooding and sewer overflows from overloaded trunk sewers.⁴ The system barely achieved a Class D rating. In 1992, the Director of the OEPA issued Findings of Fact and Orders against MSD to require elimination of Sanitary Sewer Overflows. MSD has not met the terms of the DFFO, as many sanitary sewer overflows continue to the present time. Negotiations and violations of the CWA continue to this day. The United States, the State of Ohio and Sierra Club are seeking a new order that deals comprehensively with collection system improvements and overflow controls as well as NPDES exceedences at treatment plants.
3. Serious observers of Hamilton County's wastewater control problems agree that compliance with the CWA will consume significant resources, most probably in the range of \$1 to \$3 billion.⁵ This spending will occur over time. Opinions vary over how much time, but most see completion and compliance in another 10 to 20 years.
4. Paying for compliance requires increases in wastewater user fees. The increases will take place over time, mirroring largely the construction of the plant upgrades, system improvements, and sewer overflow controls. It is important to look with candor and honesty both at the fees MSD users will pay and at the ratepayers' financial capability. Failure to do so can lead to insufficient resource allocations.

households. USEPA counsels that depreciation should be excluded from the burden assessment because depreciation is not a cash cost but rather it is a form of savings. It is paid by the community to be held in trust by the utility to replace capital as needed.

³To fulfill this assignment I reviewed the documents listed under Sources Considered. I also had conversations about this material with plaintiffs' attorneys and with Dr. Bruce Bell, plaintiffs' engineering expert. Finally, I attended the telephonic deposition of Clyde Wilber via speakerphone at the office of plaintiffs' attorney (Mr. Slap).

⁴SWIM, Summary Report, p.4. I interpret the SWIM statement to mean that for at least 21 years MSD did not spend sufficient funds to repair and maintain the collection system. Further, since from 1991 to the present the collection system continues to cause basement flooding and overflows from trunk sewers, then the insufficient funding observed by the authors of the SWIM report in 1991 continues to this day. I conclude that for 35 years the collection system in the care of MSD has been only partially funded.

⁵The 1991 SWIM report estimated it would cost about \$1.3 billion in 1991 dollars (excluding expansion of service areas) to improve MSD from a Class D to a Class B system. (Class B represents a system expected to be in compliance with early 21st century regulations and standards.) SWIM estimates it will cost \$2 billion 1991 dollars to improve MSD from a Class D to a Class A system.

5. Estimating a community's ability to pay for pollution control is complex. First, there are many variables to consider. These include pollution control costs, the current and future level of existing costs, the level and rate of growth of the number of households, the household share of flow and their median income. Second, pollution controls may not occur in isolation. Other water quality control programs, stormwater control for example, may be implemented concurrently with pollution controls. Some may try to frame the debate as a choice among programs. Others may point to cost ambiguities and play upon citizens' fears. Accordingly, good public policy requires reducing the ambiguity about the financial effects of compliance with the CWA. Third, knowing only the level of current and future costs and rates is inadequate to make judgments about a community's ability to pay to protect human health and the environment. Rates must be expressed relative to income and compared to USEPA's indicator of affordability.⁶
6. First, my analysis finds that the MSD ratepayers have the ability to pay for system improvements (SSO, CSO, WIB and treatment plant upgrades) designed from an engineering standpoint to deal with the 10-year, 24-hour storm. This is what MSD has called the Minimum or Standard Program. Rates adjusted for depreciation will increase an average of 5.4 % per year for the next 20 years. These rates, when stated as a share of median household income never exceed .8% of median household income. This is well below USEPA's threshold of financial distress. Over this period, MSD ratepayers may have to pay for other water quality programs unrelated to wastewater collection and treatment system improvements. I considered two other programs. As discussed in the Wilber declaration, a fully phased-in stormwater program may add \$50 annually. An asset management may add \$100 annually. When the costs of these programs are considered concurrently with collection and treatment system improvements, rates never exceed 1.2% of median income. MSD ratepayers, in short, clearly have the ability to pay for the improvements needed for complying with the CWA.
7. Determining the ability to pay for a program designed to control pollution from a 100-year storm is made difficult because MSD and its consultants have created controversy and confusion as to the costs associated with this program. When viewed apart from other water quality programs, however, spending for the 100-year program raises depreciation-adjusted rates to 1.6% of median income, an amount that is still below the USEPA's financial distress threshold. Finally, the MSD has framed this discussion in terms of minimum and maximum programs; it is very likely that an intermediate and/or an accelerated program could be fashioned that would achieve water quality goals more quickly and still maintain rates below the USEPA threshold.

B. MSD Estimates

8. MSD's director, Patrick Karney, has made public statements about the rates needed to pay for pollution controls. In May 2002, Director Karney told a public meeting that residential rates (whose pre-overflow control he estimated at about \$320 annually) would increase to \$1000 a year, if a program that controlled 10-year storms was implemented. His estimate for

⁶ Although tempting, it is misleading to use rate surveys to make judgements about the affordability, reasonableness or fairness of user fees across systems. Systems have to recover their costs. System costs are affected by many variables, including population density, topography, age of system, extent of funding from sources other than fees (e.g., property tax), compliance, and level of treatment. Rate surveys and subsequent comparisons seldom take these differences into account.

controlling a 100-year storm was \$5,100 annually. Mr. Karney repeated this \$5,100 estimate in August 2002 in an interview in *USA Today*. The Director presented his estimates without explaining how fast the program would be implemented, when in the future these rates might be charged, how many households underlie these estimates, whether the estimates are averages or medians or are the upper end of a very wide range. Accordingly, it is difficult to enter into any reasoned discourse about them. Indeed, one could conclude that one of his purposes was to startle the audience.

9. I also reviewed the statements made in January 2003 by MSD consultants, Clyde Wilber and George Vredeveld.⁷ Mr. Wilber estimated residential rates for pollution controls plus a stormwater program plus an asset management program. In so doing, he makes comparisons with Director Karney's estimates difficult.
10. Mr. Wilber's declaration is ambiguous about whether the water quality programs are phased-in, the rate of implementation, whether the rates jump in an instant to the new level or reach it in a long climb over time, and if and how borrowing is phased-in. During his deposition, however, Mr. Wilber admitted that his estimates represent a future peak rate, not a first-year rate. He does not know when the peak rates will be realized. He thinks that the borrowing will take place over time, but he does not know how much time.
11. Mr. Wilber found rates would increase to \$937 for a program that controlled a 10-year storm and to \$1797 for a program that controlled a 100-year storm. The estimates include a stormwater program plus an asset management program.⁸ Mr. Wilber's estimates -- which he labels "dramatic" -- are far less than Director Karney's. This is so even though he is measuring the effect on ratepayers of three programs, not just a pollution control program. Also, and this is particularly noteworthy, Mr. Wilber's calculations shift the residential share of future system costs from 67%, where it is now, to over 90%. Ambiguities about when rates will increase and his overstatement about the share of costs born by households in the future confuses and obfuscates the public discourse on the costs and timing of CWA compliance.

⁷ Mr. Wilber makes rate estimates using cost estimates prepared by MSD's consultant, BBS Corporation, MSD budget documents, his own opinions about the cost of other water quality programs, and consultations with Professor Vredeveld (and others) at the Economics Center for Education and Research at the University of Cincinnati. Mr. Wilber uses a budget document that includes depreciation. In so doing, he departs from USEPA guidance for preparing an assessment of ability to pay. Mr. Wilber includes both depreciation and asset management funding in his rate estimates and in so doing counts the same concept twice. Dr. Vredeveld uses, *inter alia*, Mr. Wilber's rate estimates to make statements about economic impact and financial capability, thereby carrying over Mr. Wilber's errors into his report.

⁸ Mr. Wilber made a dubious assumption about how to divide responsibility for future revenues between the residential and the industrial/commercial sectors. Citing a study that found surcharges to be revenue neutral he applied the results to user charges and concluded that any increase in commercial/industrial rates will be offset by (conservation) efforts that leave revenue from industry unchanged. This is fantastic. If this were true MSD could announce a rate increase and industry would reduce water use. This would effectively expand capacity. Unfortunately Mr. Wilber has made an error, because there are no expansions of capacity to be obtained simply by posting a rate increase. The reason for his error is that the behavior of industry to surcharges cannot be transferred to a base rate increases. The behavior is different because there are more substitution possibilities that allow industry to avoid a surcharge than there are to avoid a base rate increase. A consequence of Mr. Wilber's error is to shift too much responsibility for paying for overflow controls to residences, thereby exaggerating the change in residential rates.

C. Approach, Assumptions and Data

12. Why do rate estimates produced by various and concerned interest groups differ? Are MSD ratepayers being asked to carry more of a financial burden to protect human health and the environment than are the ratepayers in other parts of the country? These are important questions that require a serious look at the rates needed to pay for compliance and the community's ability of to pay.
13. My approach to assessing ability to pay follows that of the USEPA. First, I obtain estimates of the spending needed to control pollution. Next, I estimate the residential sector's share of total costs. Then, I distribute the costs to each household so that each household receives an equal share. Finally, I express the household's cost share relative to median household income and compare the result to USEPA's threshold of financial distress.⁹
14. Any critical investigation of ability to pay requires economic, demographic, and financial assumptions. My assumptions are as follows:
 - a) The users of the system will pay all the costs of the system in proportion to their flow, with households responsible for 67% of flow (current condition projected to continue into the future).
 - b) There are at least 300,000 MSD residential customers¹⁰ and their number is constant through the period 2002-2024 even though the county added 7900 households between 1990 and 2000.
 - c) Estimates of the capital costs of the treatment plant upgrades and collection system improvements are found in the BBS Corporation Report, June 2001. The report describes two programs. The first is for a 10-year storm (Minimum Program). The second is for a 100-year storm (Maximum Program). My use of BBS data overstates program costs because some controls may already be built, some are being built, and there are questions about including certain retention basin costs *and* tunnel costs in the maximum program. The questions about

⁹ USEPA considers a community on the threshold of financial distress if residential wastewater costs minus depreciation exceed 2% of median household income. Median household income is the dollar amount that divides ratepayers in half; as many households make more as make less than this amount. Some argue that median income does not represent the burden that the poorest households bear. This is true. Environmental infrastructure programs are not antipoverty programs. Communities simply do not build infrastructure (transportation, educational, public health, medical, recreational and the like) based on what the poor can afford. Poverty is a condition best addressed with poverty programs not with infrastructure programs. Others argue that households have more expenses than just wastewater. This also is true. It is possible to include expenses for example for food or utilities. It would be wrong, however, to use the same 2% threshold when expenses other than wastewater charges are included. I accept the USEPA 2% threshold and use it not only as a measure of the threshold burden in Hamilton county, but also as an indicator of the maximum amount other communities are being asked to pay for wastewater controls.

¹⁰ The 2000 U.S. Census reports 346,000 households in Hamilton County. MSD serves most but not the entire county. Subtracting out the households in Terrace Park (759), Glendale (904), and Harrison City (2682) leaves 342,000. There is an unincorporated area of western Hamilton County not served by MSD. I approximated it by Whitewater Township, which has 2038 households. This leaves 340,000 households. To be conservative I reduce this estimate by 10% and round down to 300,000.

basin *and* tunnel versus basin *or* tunnel are unlikely to be resolved soon. Consequently, I estimate the maximum program three ways: as stated by BBS; without a \$555 million tunnel, but with a retention basin at SSO 700; and, with a tunnel, but without a \$240 million retention basin at SSO 700.

- d) Pollution controls will be built over 20 years commencing in 2003 and ending 2023. Financing will commence in 2003 and the last borrowing will be in 2018.¹¹ Costs are escalated at 2.75% annually. The rate is a ten-year average of the Construction Cost Index reported by McGraw-Hill.¹²
- e) The borrowing cost is 5.5%. This rate reflects a long-term measure of the central tendency of market interest rates. The data to construct this average is available in *The Economic Report of the President*. (Although subsidized rates exist that are much lower, MSD has indicated an unwillingness to apply for them. Recent borrowing by MSD has been at rates below the long-term mean municipal rate of 5.5%.)
- f) The operating costs of the controls are proportional to their capital cost.
- g) Operating costs of the existing system less depreciation increase from a base of \$74.4 million at an annual rate of 3.5%. The rate is a ten-year average of annual changes in the water and sewer maintenance index reported by the Bureau of Labor Statistics. The base amount is given in 2001 MSD Financial Reports.
- h) Existing debt will be repaid according to the schedule in the November 2, 2001 Official Statement.
- i) Median Household income grows at 3.5% per year from its base level of \$40,000 in 1999¹³.
- j) A Stormwater program costs \$50 per household per year¹⁴.

¹¹ I also consider an accelerated minimum program that borrows the funds in 10 years and builds out in 15 years.

¹² The Bureau of Labor Statistics' now discontinued price series on water and sewer construction records an annual price change of 2.4% for 1986 to 2001.

¹³ MSD serves most but not the entire county. The U.S. Census reports median household income for Hamilton County in 1999 at \$40,964. It also reports the number of households in \$5000 ranges (e.g., the number between 35,000 and 39,999). Subtracting out Terrace Park, Glendale, Harrison City and Whitewater Township and examining the remaining households by \$5000 income ranges reveals that 49% make less than 39,999 and 54% earn less than 44,999. Mindful of this data, I place median household income at \$40,000. The growth rate is based on Nestor Terleckyj and J.F. Sencindiver's projection of regional economic growth for this region of about 1.5% annually after inflation.

¹⁴ No one knows how much stormwater controls will cost. The estimate by Mr. Wilber of \$50 per year per household is based on the experience of Fairfax VA, one of the few counties to implement a stormwater program. Hamilton County's experience may be different from Fairfax. Topography, rainfall, amounts of impervious surface are important variables to consider in a stormwater program and significant differences may exist between Fairfax and Hamilton County. Some communities are considering a separate stand-alone utility to manage stormwater. Whether there is any efficiency to this remain to be seen. At \$50 per household, Hamilton County will collect in excess of \$25 million annually. There are about 346,000 households in Hamilton county plus commerce and industry will also pay for stormwater controls (346,000 * 50)/.67 = 25.8 million.

- k) An Asset Management program costs \$100 per household per year¹⁵.

D. Results

15. Upgrading treatment plants and improving the collection system adds to MSD's debt service and O&M costs. These additional costs are paid for by rate increases. Obviously, the minimum program costs less and requires a smaller rate increase than the maximum program. See the "Fees" chart. Phasing in a program allows the increase in debt service for overflow controls to be offset somewhat as debt for the existing system is retired. This blunts the impact of any program on financial capability. This is illustrated for the 10-year program in the "Cost Share" chart.
16. The user fees needed to pay for selected programs together with estimates made by MSD and its consultants are shown in Table 1. The fees are stated in terms of the year in which they occur and are stated relative to income. Table 2 shows the fees/income financial capability indicator. The spreadsheet calculations supporting these results are in the Appendix.
17. Minimum program Rates for the minimum program rise to \$692 in 2022. When other programs such as stormwater and asset management are included rates reach \$991 in 2022. Annual charges for the minimum program rise to .8% of median household income when considered alone and rise to 1.2% of median income with stormwater and asset management programs included. Both measures are well below the financial distress threshold of 2%. See the "Threshold" chart.
18. Maximum program as defined by BBS. For the maximum program, rates rise to \$1327 in 2022. When other programs such as stormwater and asset management are included rates reach \$1626 in 2022. Annual charges for the maximum program rise to 1.6% of median household income when considered alone and rise to 2.0% of median income with stormwater and asset management programs included.

¹⁵ No one knows how much asset management will cost. The Government Accounting Standards Board (GASB) issued directive #34 requiring governments to report the value of their infrastructure in their financial reports; to report what updates and expansions are needed to provide a level of service the public wants. Any difference between needs and capability would signal a level of spending. GASB 34 does not require replacement of the system every 60-75 years. Nor does it determine the level of readiness for infrastructure. MSD, for example, could make a strategic decision to maintain infrastructure so to eliminate all overflows from 10-year storms. It would then have to report the capacity needed to achieve that goal and assess and report the capacity it now has. A charge of \$100 per MSD household plus an equivalent amount for industry and commerce translates into about \$44.8 million a year for an MSD Asset management program ($300,000 * 100 / .67 = 44.8$ million).

Table 1: Peak User Fees by Program

	Minimum only	Minimum Plus	Maximum only	Maximum Plus	Comments
Karney	1000		5100		unknown when rates peak and if they are only for pollution controls
Wilber	N/A	937 ¹⁶	N/A	1797	Unknown when rates peak
Kavanaugh	692 ^{17, 18}	991	1327	1626	Rates peak in 2022
w/o basin	N/A	N/A	1290	1588	Rates peak in 2022
w/o tunnel	N/A	N/A	1192	1491	Rates peak in 2022

Source: MSD, Wilber declaration and the Appendix to this analysis

Table 2: Financial Capability

Distress Threshold = 2.0

	Pollution control alone ¹⁹	Year achieved	Pollution control plus	Year achieved
10-Year	8 ²⁰	2013	1.2	2018
100-Year	1.6	2018	2.0	2018
w/o basin	1.6	2018	1.9	2018
w/o tunnel	1.5	2018	1.8	2018

Source: Appendix to this analysis

¹⁶ Mr. Wilber's "plus" rates include charges for both depreciation and asset management. This is double counting.

¹⁷ None of the estimates I made include a charge for depreciation. The "plus" rates include a charge for asset management, a substitute concept for depreciation.

¹⁸ The minimum accelerated 10-year program has peak rate in 2022 of \$672; the minimum plus has a peak rate in 2022 of \$970.

¹⁹ None of the estimates I made include a charge for depreciation, the pollution control "plus" rates include a charge for asset management, a substitute concept for depreciation.

²⁰ The financial capability indicator for the minimum, accelerated, pollution control alone, program reaches .9 in 2013; the accelerated minimum plus reaches 1.2 also in 2013.

19. Maximum program without the tunnel. For the maximum program without the tunnel rates rise to \$1192 in 2022. When other programs such as stormwater and asset management are included rates reach \$1491 in 2022. Annual charges for the maximum program rise to 1.5% of median household income when considered alone and rise to 1.8% of median income with stormwater and asset management programs included.
20. Maximum program without the basin. For the maximum program without the basin, rates rise to \$1290 in 2022. When other programs such as stormwater and asset management are included, rates reach \$1588 in 2022. Annual charges for the maximum program rise to 1.6% of median household income when considered alone and rise to 1.9% of median income with stormwater and asset management programs included.
21. Finally, MSD's director has voiced concerns that a pollution control program will have an adverse impact on the region's economy²¹. I find no detectable competitive impact to the county's economy. The US Department of Commerce, Bureau of Economic Analysis describes Hamilton County as a \$28 billion dollar economy. That is, when the sum of wages and salaries, interest and rents and profits earned in the county are summed the result is \$28 billion a year. The annual incremental cost of pollution controls as a share of the county's economy will vary over time as the program is phased in and the regional economy grows. Using the most expensive program – Maximum program as stated by BBS, the annual cost of the program ranges from .6% of the county economy in year 1 to about 1.2% of the county economy in year 18. Some of this spending will be spent within the county and contribute to its growth. Even if, to set a polar case, all spending for pollution control goes to workers and companies that are located outside the county, the maximum competitive impact on the county's economy will be less than 1.2% of income. This is because other communities that compete with Hamilton County are also building pollution controls. Thus, the *status quo* difference between MSD and regional competitors is no more than 1.2%. A change of this small size is lost in the flux of other price changes for the components of income: labor, capital, energy, and materials.

Michael Kavanaugh, Ph.D

Date: _____

²¹ Director Karney was quoted in the August 21, 2002, issue of USA Today that eliminating SSOs would "bankrupt us... It would be, last one out, turn out the lights. Cincinnati would be just another wide spot on I-75." In my opinion, this statement has no basis in fact or economic analysis.

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